

24.7000

38937

S/181/62/004/007/001/037
B102/B104

AUTHORS: Litovchenko, P. G., and Ust'yanov, V. I.

TITLE: Kinetics of gamma conductivity in cadmium sulfide crystals

PERIODICAL: Fizika tverdogo tela, v. 4, no. 7, 1962, 1689 - 1694

TEXT: The kinetics of gamma conductivity in hexagonal CdS crystals was studied experimentally at room temperature. The method is described in Ukr. fiz. zhurn., 5, 606, 1960. The base of the crystals was 2 - 4 mm², their height 2.5 - 3 mm. The measurements were made in the dark (at constant dark current) and under a gamma irradiation (Co⁶⁰) of 3600 μ r/sec; also under light (constant photocurrent) of λ 407, 547, 667; and 706 m μ , transmission band $\lambda \approx 15$ m μ simultaneously with the above mentioned gamma radiation. $\Delta I_{ph}/\Delta I_{\gamma}$ was 1, 4, 10 and the photocurrents were between 5 and 50.10¹¹ quanta/cm.sec. The measurements are presented graphically in curves indicating the time dependences of $\Delta I_{\gamma}/\Delta I_{max}$ under the different conditions. These show that (1) the kinetics of gamma conductivity de-
Card 1/3

Kinetics of gamma ...

S/181/62/004/007/001/037.
B102/B104

pend on the degree to which the impurity centers are filled;
(2) irradiation with visible light considerably influences the kinetics of gamma conductivity if the wavelength is beyond the self-absorption edge, this being related to the penetration depth which increases with λ ;
(3) in the non-illuminated crystal, excitation and weakening of the gamma current are subject to a complex law, but the illuminated crystal obeys an exponential law; i. e. the impurity centers are largely filled up with electrons excited by light. At a given irradiation intensity this means that during irradiation the extent to which the impurity centers are filled remains practically constant. As the number of free carriers in the conduction band increases, so does the number of recombining electrons, thus leading to a state of equilibrium. If irradiation ceases the impurity levels no longer remain subject to the carrier redistribution mechanism and the gamma conductivity decreases exponentially. The fact that CdS crystals are activated by light is of practical importance. There are 6 figures and 2 tables.

ASSOCIATION: Institut fiziki AN USSR Kiyev (Institute of Physics AS UkrSSR Kiyev)

Card 2/3

Card 3/3

LITOVCHENKO, P. G.

35193
S/185/62/007/002/005/016
D299/D302

24,7700 (1043,1055,1137)

AUTHORS: Hlynchuk, K.D., and Lytoychenko, P.H.

TITLE: Kinetics of segregation of iron, cobalt, nickel and silver impurities from germanium

PERIODICAL: Ukrayins'kyy fizychnyy zhurnal, v. 7, no. 2, 1962,
148 - 150

TEXT: The relationship is ascertained between the rate of segregation and the diffusion coefficient of impurity atoms of Fe, Co, Ni and Ag in germanium at various annealing temperatures (150 - 600 °C). The investigations included measurements of the lifetime τ of minority carriers in n- and p-type germanium specimens in which the concentration of readily ionized Sb- and Ga impurities exceeded considerably the concentration of Fe, Co, Ni and Ag impurity-centers. In such specimens, τ varies in inverse proportion with the change in concentration of these impurities. The preparation technique and the method of measurement were described in the references. The experiments showed that an increase in annealing temperature leads to

Card 1/3

S/185/62/007/002/005/016
D299/D302

Kinetics of segregation of iron, ...

a considerable increase in the segregation rate of the Fe-impurity; the minority-carrier lifetime τ approaches saturation with increasing annealing time. A figure shows the temperature dependence of τ for germanium with Co-impurity before and after annealing; τ was increased by a factor of 2.5 through annealing, yet the course of its temperature dependence remained unchanged. The experiments show that the saturation of τ is related to a state, in which structural defects are predominant in the recombination process. Analogous results were obtained for all the other specimens with Fe, Co, Ni and Ag impurities. The rates of segregation of Fe, Co, Ni and Ag impurities were compared at temperatures of 400 - 600°C. It was found that at all the temperatures the segregation rates of Fe, Co and Ag were practically the same, whereas the segregation rate of Ni was considerably higher. The obtained results can be fully explained by the change (with temperature) of the diffusion coefficients of the impurities, and by their different values for Fe, Co, Ni and Ag atoms. Thus, the conjecture (made in the references), that the segregation rate of impurities is mainly determined by their rate of diffusion to the nucleation centers, was confirmed.

Card 2/3

Kinetics of segregation of iron ...

S/185/62/007/002/005/016
D299/D302

There are 2 figures, and 9 references: 7 Soviet-bloc and 2 non-Soviet-bloc. The references to the English-language publications read as follows: L. Wei, Phys. Chem. Solids, 18, 162, 1961; G.K. Wertheim, Phys. Rev., 115, 37, 1959; W. Tyler, Phys. Chem. Solids, 8, 59, 1959; F. Trumbore, Bell System Techn., J. 39, 205, 1960.

ASSOCIATION: Instytut fizyky AN URSR (Institute of Physics of the AS UkrRSR) Kyiv

SUBMITTED: March 23, 1961

Card 3/3

LITOVCHENKO, P. G.

90

PHASE I BOOK EXPLOITATION

SOV/6176

Konobeyevskiy, S. T., Corresponding Member, Academy of Sciences
USSR, Resp. Ed.

Deystviye yadernykh izlucheniiv na materialy (The Effect of
Nuclear Radiation on Materials). Moscow, Izd-vo AN SSSR,
1962. 383 p. Errata slip inserted. 4000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Otdeleniye tekhnicheskikh nauk; Otdeleniye fiziko-matematicheskikh nauk.

Resp. Ed.: S. T. Konobeyevskiy; Deputy Resp. Ed.: S. A. Adaminskiy; Editorial Board: P. L. Gruzin, G. V. Kurdyumov, B. M. Levitskiy, V. S. Lyashenko (Deceased), Yu. A. Martynyuk, Yu. I. Pokrovskiy, and N. F. Pravdyuk; Ed. of Publishing House: M. G. Makarenko; Tech. Eds: T. V. Polyakova and I. N. Dorokhina.

Card 1/14

90
30V/6176
The Effect of Nuclear Radiation (Cont.)

PURPOSE: This book is intended for personnel concerned with nuclear materials.

COVERAGE: This is a collection of papers presented at the Moscow Conference on the Effect of Nuclear Radiation on Materials, held December 6-10, 1960. The material reflects certain trends in the work being conducted in the Soviet scientific research organization. Some of the papers are devoted to the experimental study of the effect of neutron irradiation on reactor materials (steel, ferrous alloys, molybdenum, avial, graphite, and nichromes). Others deal with the theory of neutron irradiation effects (physico-chemical transformations, relaxation of internal stresses, internal friction) and changes in the structure and properties of various crystals. Special attention is given to the effect of intense γ -radiation on the electrical, magnetic, and optical properties of metals, dielectrics, and semiconductors.

Card 2/14

The Effect of Nuclear Radiation (Cont.)

10
SOV/6176

Konozenko, I. D., and V. I. Ust'yanov. Effect of γ -Rays
on Properties of CdS Single Crystals 318

Titov, P. P., A. K. Kikoin, and A. Ye Buzynov. Stimulating
Action of X- and γ -Rays on Flotation Process 329

Byalobzheskiy, A. V., V. D. Vall'kov, and V. N. Lukinskaya.
Effect of Radiation on Corrosion Properties of Metals and
Alloys 332

Galushka, A. P., P. G. Kitovchenko, and V. I. Ust'yanov.
Methods of Investigating Properties of Semiconductors
Irradiated by γ -Quanta 341

Starodubtsev, S. V., S. A. Azizov, I. A. Domaryad, Ye. V.
Peshikov, and L. P. Khiznichenko. Change in Mechanical
Properties of Some Solids Subjected to γ -Radiation 347

Card 12/14

- 6 -

L 3409-66 EWT(1)/EWT(m)/EPF(c)/EPF(m)-2/T/EWA(h) IJP(c) 00/08/AT
 ACCESSION NR: AT3023816 UR/0000/62/000/000/0341/0346 L7
 AUTHOR: Galushka, A. P.; Litovchenko, P. G.; Ust'yanov, V. I. 44.55 19 B+1
 TITLE: Method of studying the properties of semiconductors irradiated with gamma quanta 21.44.55
 SOURCE: Soveshchaniye po problemam Deystviya yadernykh izlucheniya na materialy. Moscow, 1960. Deystviya yadernykh izlucheniya na materialy (The effect of nuclear radiation on materials); doklady soveshchaniya: Moscow, Izd-vo AN SSSR, 1962, 341-346
 TOPIC TAGS: semiconductor, gamma irradiation, electron energy level, dark current, photoconductivity, irradiation effect, electric conductivity
 ABSTRACT: The apparatus employed consists of a container for the Co⁶⁰ source of gamma radiation, a system for illuminating the semiconductor sample, and a thermostat, all of which are described in detail together with the electric circuit. The experimental method involves the detection of donor levels and determination of their depth by measuring the dark current I_d as a function of temperature T . The presence and depth of trap-type levels is determined by means of the thermally stimulated photoconductivity and thermally stimulated conductivity. The

Card 1/2

L 3409-66

ACCESSION NR: AT5023816

stability of the radiation defects was observed and determined by recording the relation $\log \sigma_T = f(h\nu)$. Kinetic light characteristics (curves of excitation and drop of photocurrent) were recorded with an ENO-1 oscillograph, and curves of γ excitation (γ drop) were recorded with an EPPV-51 electronic recorder. Orig. art. has: 4 figures.

ASSOCIATION: none

SUBMITTED: 18Aug62

NO REF SOV: 001

ENCL: 00

SUB CODE: SS, NF

OTHER: 000

Card 2/3 *h*

GALUSHKA, A.P.; LITOVCHENKO, P.G.; UST'YANOV, V.I.

Method of investigating the photoelectric properties of semi-conductors. Zav.lab. 29 no.11:1335-1338 '63. (MIRA 16:12)

1. Institut fiziki AN UkrSSR.

L 3409-66 EWT(1)/EWT(m)/EPF(c)/EPF(n)-2/T/EWA(h) IJP(c) GG/GS/AT

ACCESSION NR: AT5023816

UR/0000/62/000/000/0341/0342

AUTHOR: Galushka, A. P.; Litovchenko, P. G.; Ust'yanov, V. I.

TITLE: Method of studying the properties of semiconductors irradiated with gamma quanta

SOURCE: Soveshchaniye po probleme Deystviye yadernykh izlucheniya na materialy. Moscow, 1960. Deystviye yadernykh izlucheniya na materialy (The effect of nuclear radiation on materials); doklady soveshchaniya: Moscow, Izd-vo AN SSSR, 1962, 341-346

TOPIC TAGS: semiconductor, gamma irradiation, electron energy level, dark current, photoconductivity, irradiation effect, electric conductivity

ABSTRACT: The apparatus employed consists of a container for the Co^{60} source of γ -radiation, a system for illuminating the semiconductor sample, and a thermostat, all of which are described in detail together with the electric circuit. The experimental method involves the detection of donor levels and determination of their depth by measuring the dark current I_d as a function of temperature T . The presence and depth of trap-type levels is determined by means of the thermostimulated photoconductivity and thermostimulated γ conductivity. The

Card 1/2

L 3409-66

ACCESSION NR: AT5023816

stability of the radiation defects was observed and determined by recording the relation $\log \delta_T = f(\phi)$. Kinetic light characteristics (curves of excitation and drop of photocurrent) were recorded with an ENO-1 oscillograph, and curves of γ excitation (γ drop) were recorded with an EPFV-51 electronic recorder. Orig. art. has: 4 figures.

ASSOCIATION: none

SUBMITTED: 18Aug62

ENCL: 00

SUB CODE: SS, NP

NO REF SOV: 001

OTHER: 000

Card 2/2 *hd*

DEKHTYAR, I.Ya. [Dekhtiar, I.IA]; LITOVCHENKO, S.G. [Lytovchenko, S.H.];
URSUL, D.A.

Effect of short-range order on residual electrical resistance of
nickel-base alloys [with summary in English]. Ukr.fiz.zhur. 3 no.4:
506-515 J1-Ag '58. (MIRA 11:12)

1. Institut metallofiziki AN USSR.
(Nickel alloys--Electric properties)

LISNIK, A.G. [Lisnyk, A.H.]; LITOVCHENKO, S.G. [Lytovchenko, S.H.]; URSUL, D.A.;
SAVCHENKO, N.A.

Effect of short-range order on electrical resistance of some binary
alloys [with summary in English]. Ukr.fiz.zhur. 3 no.4:521-527
Jl-Ag '58. (MIRA 11:12)

1. Institut metallofiziki AN USSR.
(Alloys--Electric properties)

S/601/60/000/011/012/014
D207/D304

AUTHORS: Dekhtyar, I. Ya., Litovchenko, S. G., and
Fedchenko, R. G.

TITLE: Investigating the effect of plastic deformation
on the electrical properties of alloys in the
Fe-Al system

SOURCE: Akademiya nauk Ukrayins'koyi RSR. Instytut
metalofyzyky. Sbornik nauchnykh rabot. no.
11. 1960. Voprosy fiziki metallov i metallo-
vedeniya, 121 - 128

TEXT: The authors investigated the influence of crystal de-
fects produced by plastic deformation on the electrical resis-
tivity of pure iron and of Fe-Al alloys with 0.13 - 8% Al.
Cast alloys were homogenized (120 hours at 1150°C), forged, drawn
into a wire of 0.56 mm diameter, annealed (3 hours at 800°C), and
finally cooled in air. Extension was produced by a constant load

Card 1/3

Investigating the effect...

S/601/60/000/011/012/014
D207/D304

of 1.5 - 2 kg and measured by a clock mechanism. The electrical resistivity was determined with a ППТН (PPTN) potentiometer and a highly sensitive galvanometer M25/3 (M25/3). For pure iron and Fe-0.13% Al, it was found that (1) $\Delta \rho / \rho_0 = A \epsilon^{3/2}$, where $\Delta \rho$ is the change of resistivity due to plastic deformation, ρ_0 is the initial resistivity (in ohm cm), ϵ is the relative deformation (in%), and A is a constant; (2) the increase of resistivity was primarily due to vacancies. The electrical resistivity due to one vacancy in pure iron was $1.1 \times 10^{-21} \mu\text{ohm cm/cm}^3$; and for Fe-0.13% Al, it was $0.6 \times 10^{-21} \mu\text{ohm cm/cm}^3$. For the alloys with 0.28 - 1.08% Al, it was found that $\Delta \rho / \rho_0 = B \epsilon^{1/2}$ and that the increase in resistivity was primarily due to dislocations; the electrical resistivity due to one dislocation was of the order of $10^{-13} \mu\text{ohm cm/cm}^3$, and it rose with increase of the

Card 2/3

Investigating the effect...

S/601/60/000/011/012/014
D207/D304

aluminum content. The Fe-8% Al alloy behaved differently from all the other alloys: its electrical resistivity was reduced by plastic deformation. This was due to destruction of the short-range order produced by the 800°C heat treatment before tests. It was also found that the electrical resistivity of all the alloys, except Fe-8% Al, rose linearly with their Al content. There are 4 figures, 1 table and 11 references: 3 Soviet-bloc and 8 non-Soviet-bloc. The 4 most recent references to the English-language publications read as follows: D. L. Dexter, Phys. Rev., 90, 710, 1953; S. C. Hunter, F. Nabarro, Proc. Roy. Soc., 220, 542, 1953; W. A. Harryson, Phys. Chem. of Solids, 5, 44, 1958; Matsura Keisuke, Hamaguchi Voshikazu, Koda Shigeyasu, J. Phys. Soc. Japan, 12, 1424, 1957.

SUBMITTED: June 24, 1959

Card 3/3

LITOVCHENKO, S.G.

S/185/61/006/002/012/020
D210/D304

AUTHORS: Dekhtyar, I.Ya., Lytovchenko, S.H., and Fedchenko, R.H.

TITLE: Effect of plastic deformation on the electrical resistance of alloys

PERIODICAL: Ukrayinskyy fizychnyy zhurnal, v. 6, no. 2, 1961,
233 - 238

TEXT: The authors describe the influence of vacancies and dislocation in alloys on the electrical resistance of the alloys. There exists a large amount of theoretical data on the effect of plastic deformations on electrical resistance and the main purpose of this study was to check this theory as well as the authors' theory presented in an earlier publication which states that

$$\frac{\Delta \rho}{\rho_0} = \frac{\rho}{\rho_0} f(b^{-1} k \xi''') + \frac{\rho}{\rho_0} k \xi'' = A \xi'' + B \xi''', \quad (1)$$

Card 1/4

Effect of plastic deformation ...

S/185/61/006/002/012/020
D210/D304

✓

ρ - increase of specific resistance; ρ_0 - initial specific resistance; ρ_v - resistance due to one vacancy; ρ_d - resistance due to one dislocation; b - Buerger's vector; l - mean length of free dislocation run; f - coefficient specifying the effective number of steps which are the source of dislocations. From this equation, the constants A and B , and hence ρ_v and ρ_d can be easily calculated by plotting experimental values of $\Delta\rho/\rho_0$ against ϵ and this should give a straight line. Experimental resistivity measurements were made on Fe + Mo (0.9 to 1.5 %) at room temperature and Fe + 1.0 at .% Ni, Fe + 0.9 at .% Mo, and Fe + 0.9 at .% V at 78°K. The samples were in the form of 0.5 mm diameter wire, 9 cm long and they were strained up to 10 % at room temperature, and up to 150 % at 78°K. The resistance measurements were made with a potentiometer and a sensitive galvanometer. For the Fe + Mo alloy measurements carried out at room temperature the plot of $\Delta\rho/\rho_0$ against ϵ gave straight lines implying that the principal cause of resistance in-

Card 2/4

Effect of plastic deformation ...

S/185/61/006/002/012/020
D210/D304

crease is due to dislocations. This can be explained by concentrating vacancies near the admixed atoms, forming a "modified admixture". The Mo concentration in this experiment had no significant effect, probably because it was very high (0.9 %) in the lowest concentration. On the basis of k determined in the previous experiment, ρ_d was found to be $17 \cdot 10^{-14} \mu\Omega \text{ cm/cm}^{-2}$. No appreciable change in resistance was found on annealing for 8 hours at 100°C after 10 % deformation of a Fe + Mo specimen. For low temperature measurements the deformation was effected at room temperature while the resistivity was measured at 78°K . After a certain deformation a limit in the number of defects is reached and the resistivity reaches a limiting value. By plotting these curves according to Eq. (1) straight lines were obtained in each case. Fe + Mo gave $A = 0.037$ and $B = 0.011$. The curve for Fe + Ni, plotted up to $\epsilon = 70 \%$, gave a straight line going through the origin implying that the main source of resistance are vacancies, with the relationship $\Delta\rho/\Delta\rho_0 = 0.01 \epsilon^{3/2}$. For the vanadium alloy A was found to be zero

Card 3/4

Effect of plastic deformation ...

S/185/61/006/002/012/020
D210/D304

and $B = 0.095$. The differences between these curves are attributed by the authors to the affinity of the admixed atoms for the vacancies, being greatest for V and least for Ni. Other factors which may affect the resistivity are the scattering of electron waves by point defects (vacancies) and dislocations, and the interaction of point defects with dislocations. There are 3 figures and 7 references: 1 Soviet-bloc and 6 non-Soviet-bloc. The references to the 4 most recent English-language publications read as follows: P. Jongenburger, Phys. Rev., 90, 710, 1953; F. Seitz, Advances in Physics, 1, 43, 1952; S.C. Hunter, N.F. Nabarro, Proc. Roy. Soc., 1953 220, 542; W.A. Harrison, Phys. Chem. of Solids, 1958, t. 5, 44-46. ✓

ASSOCIATION: Instytut metalofizyky AN URSR m. Kyiv (Institute of Metal Physics AS UkrSSR, Kiyev)

SUBMITTED: June 18, 1960

Card 4/4

S/O20/62/147/006/014/034
B104/B180

AUTHORS: Dekhtyar, I. Ya., Litovchenko, S. G., Mikhalenkov, V. S.

TITLE: Positron-electron annihilation in ordering alloys

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 147, no. 6, 1962, 1332-1335

TEXT: Methods developed in recent years are here used for the first time to study the variation in the maximum momenta p_m of conduction electrons on the ordering of the alloys Ni_3Mn , Cu_3Au and $CuAu$. The alloys differ both structurally, and in the elastic stresses of the lattice, which are due to the different atomic dimensions. For ordered-state $CuAu$ p_m is $8.0 \cdot 10^{-3}$ mc, for disordered, $8.9 \cdot 10^{-3}$ mc. Similar results were obtained with Ni_3Mn , but with Cu_3Au there is no difference in p_m for the ordered or disordered states. $N(p)$ the momentum distribution of conduction electrons in the Brillouin zone is plotted from the angular dependence of the annihilation photons according to A. T. Stewart (Can. J. Phys., 35, 168 (1957)) (Fig. 2). The change in $N(p)$ on ordering primarily indicates

Card 1/2

Positron-electron annihilation ...

S/020/62/147/006/014/034
B104/B180

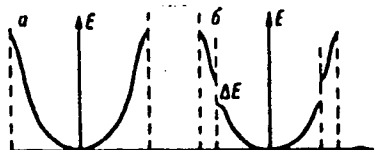
compression of the energy levels on formation of the energy gap ΔE (separation of the Brillouin zone into two halves). Further, as the total number of occupied energy levels remains constant, $N_{\max}(p)$ must be larger for the ordered than the disordered state. The variation in the mean kinetic energy of electrons due to change in the degree of long-range order is investigated in a manner similar to that employed by H. Jones (Proc. Phys. Soc., 49, 243 (1937)) for the variation in Fermi energy on the α - and β -phase stabilization of brass. It is found that p_m diminishes on ordering. There are 2 figures. ✓

ASSOCIATION: Institut metallofiziki Akademii nauk USSR (Institute of Physics of Metals of the Academy of Sciences UkrSSR)

PRESENTED: June 8, 1962, by G. V. Kurdyumov, Academician

SUBMITTED: June 4, 1962

Fig. 2



Card 2/2

DEKHTYAR, I.Ya.; LITOVCHENKO, S.G.; MIKHALENKOV, V.S.

Annihilation of positrons and electrons in iron-silicon alloys.

Sbor. nauch. rab. Inst. metallofiz. AN URSR no.17:50-54 '63.

(MIRA 17:3)

L 8830-65 ENT(m)/T/IMP(q)/EWP(b)/EWL(n)-2 AS(mp)-2/ASD(a)-5/RAEM(a)
AFWL/AFMDC/ESD/ESD(gs)/ESD(t)/RAEM(t) JD/JG

ACCESSION NR: AT4042842

S/2601/64/000/018/0198/0201

AUTHOR: Dekhtyar, I. Ya. ; Litovchenko, S. G. ; Mikhalekov, V. S.

TITLE: Annihilation of positrons by electrons in gadolinium

SOURCE: AN UkrSSR. Institut metallofiziki. Sbornik nauchnykh rabot, no. 18, 1964. Voprosy fiziki metallov i metallovedeniya (Problems in the physics of metal and physical metallurgy), 198-201

TOPIC TAGS: gadolinium, transition element, positron, electron, positron annihilation, gamma radiation, gamma ray distribution, antiferromagnetism, paramagnetism, Curie point, electron spin, spin cluster, Fermi boundary

ABSTRACT: On the basis of previous work, the transition from the antiferromagnetic to the paramagnetic state, which is accompanied by a change in the density of electron states, would be expected to have a definite effect on the form of the angular distribution of the γ -quanta arising during the annihilation of positrons by electrons. The present authors, therefore, studied the annihilation of positrons by electrons in 99.8% pure polycrystalline gadolinium during transition through the Curie point (289K). A comparison of the angular distribution of the γ -quanta obtained at 11 and 20C, corresponding to the ferromagnetic and

Card 1/3

L 8830-65

ACCESSION NH: AT4042842

paramagnetic states, respectively, showed that the density of states at the Fermi boundary increases by about 15% on passage through the Curie point (see Fig. 1 of the Enclosure). The agreement between these findings and the changes in certain other physical properties of gadolinium during magnetic transformation indicates that all these effects are due to a change in the state of the electrons resulting from the change in the character of spin ordering at the Curie point; below this point, there is distant ordering of parallel spins, while above it there is close ordering, resulting in spin clusters. It is pointed out, however, that detailed analysis of these effects is made difficult by the contribution of the lower electron levels to the γ -spectrum of the transition elements. Orig. art. has: 2 figures.

ASSOCIATION: Institut metallofiziki AN UkrSSR (Institute of the Physics of Metals, AN UkrSSR)

SUBMITTED: 14Mar63

ATD PRESS: 3106

ENCL: 01

SUB CODE: NP, MM

NO REF SOV: 004

OTHER: 006

Cord 2/3

L 8830-55

ACCESSION NR: AT4042842

ENCLOSURE: 01

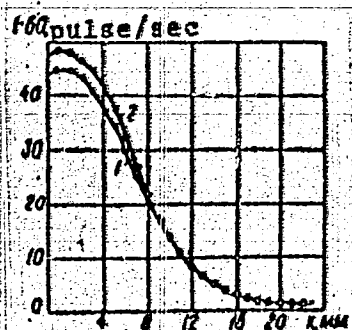


Fig. 1. Angular distribution of the γ -quanta arising as the result of annihilation:
1 — temperature = 20C; 2 — temperature = 11C.

Card 3/3

LITOVCHENKO, S.M.; ROMAS'KO, S.S.

Progressive norms for the expenditure of materials. Sbor. nauch.
trud. UkrNIISol' no.7:134-140 '64. (MIRA 18:1)

L 51505-65 EWT(1)/EED-2/EWP(1) PQ-4/Pg-4/PK-4 LJP(c) BB/GG

ACCESSION NR: AP5015337

UR/0286/65/000/009/0091/0092
68L142 652.2

AUTHOR: Litovchenko, S. S.

TITLE: A method of information storage. Class 42. No. 170753

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 9, 1945, 91-92

TOPIC TAGS: information recording, computer memory, magnetic core storage

ABSTRACT: This Author's Certificate introduces a method for recording information in a memory which contains a matrix of ferrite cores threaded by a system of mutually orthogonal busses x and y . The reliability of the memory is improved by passing a current pulse along bus x which is sufficient for magnetic reversal of the cores threaded by this bus, while a series of hf pulses which prevent this magnetic reversal are passed through the busses y which thread the cores in which information is not being recorded.

ASSOCIATION: none

Card 1/2

L 51505-65

ACCESSION NR: AP5015337

SUBMITTED: 25Sep63

ENCL: 00

SUB CODE: DF

NO REF SOV: 000

OTHER: 000

Card

2/2

L 54546-65 EWT(d)/EED-2/ENP(1) Pq-4/Pg-4/Pk-4 IJP(c) BE/GG

ACCESSION NR: AP5015530

UR/0286/65/000/008/0067/0067

AUTHOR: Litovchenko, S. S.

TITLE: Storage device with recording and readout of information by total current.

Class 42, No. 1/0211

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, No. 8, 1965, 67

TOPIC TAGS: storage device

ABSTRACT: This Author Certificate presents a storage device with recording and readout of information by total currents. Each storage unit has a supplementary coil decoupled from the supplementary coils of the cores of the given digit using a diode and connected by a common digit switch serving to exclude the recording of "1" (see Fig. 1 on the Enclosure). To increase the reliability of the storage device, it contains an additional digit switch serving to supply the shift voltage to the diodes of the supplementary coils during the recording of "1" in the core of the given digit. Orig. art. has: 1 diagram.

ASSOCIATION: none

SUBMITTED: 29Jul63

ENCL: 01

SUB CODE: DP, EO

NC REF SOV: 000

OTHER: 000

Card 1/2

L 54546-65

ACCESSION NR: AP5015530

ENCLOSURE: 01

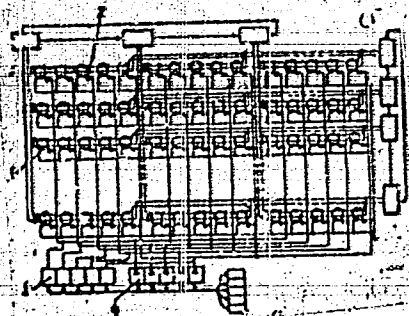


Fig. 1. 1- supplementary coil; 2- diode;
3- switch; 4- additional switch

Cerd 2/2

L 13966-66 EWT(1)/EWA(h)

ACC NR: AP5005290

SOURCE CODE: UR/0413/66/000/001/0034/0034

INVENTOR: Litovchenko, S. S.

ORG: none

TITLE: Power oscillator¹⁵ of hf pulse packets. Class 21, No. 177457

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 1, 1966, 34

TOPIC TAGS: pulse oscillator, hf oscillator, transistorized oscillator

ABSTRACT: An Author Certificate has been issued for an hf power oscillator (Fig. 1) containing lf and hf blocking oscillators. To increase the power, simplify the oscillator circuit, and ensure reliability, the collector of the lf transistor is connected to the

Card 1/2

UDC: 621.373.52

L 13966-66

ACC NR: AP6005290

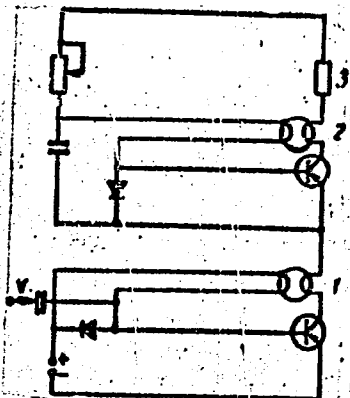


Fig. 1. Power oscillator

- 1 - Lf blocking oscillator;
- 2 - hf blocking oscillator;
- 3 - load.

emitter of the hf transistor through the primary winding of the lf oscillator. The load is connected in series with the primary winding of the hf oscillator. Orig. art. has: 1 figure. [KM]

SUB CODE: 09/ SUBM DATE: 31Oct64/ ATD PRESS: 4/19/

Card 2/2

ACC NR: AP7001379

(A,N)

SOURCE CODE: UR/0413/66/000/021/0053/0053

INVENTOR: Litovchenko, S. S.

ORG: none

TITLE: Amplifier-inverter for memories. Class 21, No. 187831.

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 21, 1966, 53

TOPIC TAGS: transistorized amplifier, computer memory

ABSTRACT: This Author Certificate presents an amplifier-inverter for memories with gating of the outputs by a common switch of transistors and cores. The device contains a storage capacitor for delaying the input signal relative to the gated. To increase the reliability of operation of the amplifier, the storage capacitor is connected through a diode and resistance to the collector of the input transistor, through another resistance to the winding of the inverting core, and through a diode to the collector of the gating transistor.

SUB CODE: 09/ SUBM DATE: 28May65

Card 1/1

UDC: 681.142.07:53.084.6

MAN'KOV'S'KIY, B.M.; LITOVCHENKO, S.V.

Myotonic dystrophy. *Fiziol.zhur.* (Ukr.) 2 no.3:38-46 My-Je '56.
(MLRA 9:10)

1. Kiivs'kiy medichniy institut imeni akademika O.O.Bogomol'tsya,
kafedra nervovikh khvorob.
(DYSTROPHY, MUSCULAR)

LITOVCHENKO, S. V.

VASHCHENKO, M.A.; YATEL', T.P.; LITOVCHENKO, S.V.

Disorders of the nervous system in influenza C. Vrach, delo no. 4:
(MLRA 10:7)
373-376 Ap '57.

1. Vtoroye klinicheskoye otdeleniye (zav. - prof. N.I. Moroskin),
epidemiologicheskiy otdel (zav. - kand. med. nauk N.F. Komyushenko)
Instituta infektionnykh bolezney AMN SSSR i kafedra nervnykh
bolezney (zav. - deystv. chlen AMN SSSR, prof. B.N. Man'kovskiy)
Kiyevskogo meditsinskogo instituta.
(NERVOUS SYSTEM--DISEASES) (INFLUENZA)

LITOVCHENKO, S.V.

Clinical aspects and pathogenesis of progressive muscular atrophy.
Vrach.delo no.12:1285-1288 D '57. (MIRA 11:2)

1. Akademiya meditsinskikh nauk SSSR (rukovoditel' gruppy - deystvi-
tel'nyy chlen AMN SSSR, prof. B.M.Man'kovskiy)
(MUSCULAR DYSTROPHY)

LITOVCHENKO, S. V., Cand Med Sci -- "Progressive muscular atrophy. (Problems of ^{the} clinic, pathogenesis, and treatment)." Kiev, 1958 (Kiev Order of Labor Red Banner Med Inst im Academician A. A. Bogomolets). (KL, 1-61, 208)

-402-

VASHCHENKO, M.A.; LITOVCHENKO, S.V.; YATEL', T.P.

Neurological syndromes in influenza during the 1959 epidemic. Vrach.
delo no.8:55-59 Ag '60. (MIRA 13:9)

1. Institut infektsionnykh bolezney AMN SSSR i klinika nervnykh
bolezney (zav. kafedroy - deystvitel'nyy chlen AMN SSSR, prof. B.N.
Man'kovskiy) Kiyevskogo meditsinskogo instituta.
(INFLUENZA) (NERVOUS SYSTEM—DISEASES)

LITOVCHENKO, S.V.

Treatment of progressive muscular atrophy. Vop. klin. nevr. i
psikh. no.2:191-206 '58. (MIRA 14:10)
(ATROPHY, MUSCULAR)

KUCHEROVA, L.L.; LITOVCHENKO, S.V.

Creatine-creatinine and carbohydrate metabolisms in progressive muscular
atrophy. Vop. klin. nevr. i psikh. no.2:207-215 '58. (MIRA 14:10)
(ATROPHY, MUSCULAR) (CARBOHYDRATE METABOLISM)
(CREATINE) (CREATININE)

LITOVCHENKO, S.V.; GAVRIL'CHIK, N.S.; SABLTOVA, E.G. (Kiyev)

Use of novocaine in cerebral arteriosclerosis. Vrach. delo no.1:
68-72 Ja '62. (MIRA 15:2)

1. Otdeleniye vozrastnykh izmeneniy nervnoy sistemy (nauchnyy
rukovoditel' - deystvitel'nyy chlen AMN SSSR, prof. B.N.Man'kovskiy)
Instituta gerontologii i eksperimental'noy patologii AMN SSSR.
(NOVOCAINE) (ARTERIOSCLEROSIS)
(CEREBROVASCULAR DISEASES)

LITOVCHENKO, S.V.; GLAZ, F.A.

Exercise therapy in the compound treatment of progressive
muscular atrophy. Zhur. nevr. i psikh. 62 no.5:699-702
'62. (MIRA 15:6)

1. Klinika nervnykh bolezney (nauchnyy rukovoditel' - prof.
B.N. Man'kovskiy) Kiyevskogo meditsinskogo instituta.
(ATROPHY, MUSCULAR) (EXERCISE THERAPY)

LITOVCHENKO, S.V.

Use of ridinole in treating extrapyramidal insufficiency in people over 60 [with summary in English]. Vrach.delo no.9:83-87 S '62.

(MIRA 15:8)

1. Otdeleniye vozrastnykh izmeneniy nervnoy sistemy (nauchnyy rukovoditel' - deystvitel'nyy chlen AMN SSSR, prof. B.N.Man'kovskiy) Instituta gerontologii i eksperimental'noy patologii AMN SSSR.

(AUTONOMIC DRUGS) (GERIATRICS)

GRISHKO, F.I. [Hryshko, F.I.]; LYTOVCHENKO, S.V. [Lytovchenko, S.V.]

Physiological characteristics of the neuromuscular apparatus
in aged persons. Fiziol. zhur. [Ukr.] 10 no.1:31-37 '64.

(MIRA 17:8)

1. Laboratoriya biologii i otdel vozrastnykh izmeneniy nervnoy
sistemy Instituta gerontologii i eksperimental'noy patologii
AMN SSSR, Kiyev.

MINTS, A.Ya.; LITOVCHENKO, S.V.; TITARENKO, M.P.

State of the vegetative nervous system in elderly and senile persons; clinical physiological study of neurovascular reactions. Fiziol. zhur. [Ukr.] 11 no.6:786-795 N-D '65. (MIRA 19:1)

1. Otdeleniye vozrastnykh izmeneniy nervnoy sistemy Instituta gerontologii AMN SSSR, Kiyev. Submitted April 14, 1965.

S/120/63/000/001/032/072
E032/E314

AUTHORS: Mil'ner, A.S., Litovchenko, T.A. and Tatarinova, L.N.
TITLE: Determination of the magnetic characteristics of thin ferromagnetic films
PERIODICAL: Priroda i tekhnika eksperimenta, no. 1, 1963, 131 - 132
TEXT: A torsion magnetometer is described for determination of magnetization curves and static hysteresis loops of ferromagnetic films in the temperature range 60 - 1 000 °K. The magnetometer is shown in Fig. 1. It consists of an evacuated glass or quartz tube 1. A quartz rod 4 is attached to a phosphor-bronze suspension at one end and to a copper holder 3 at the other. The film under investigation is placed in this holder, while the suspension 5 is attached to the copper rod 6 which passes through the glass-to-metal seal 7. A rigid copper frame 8 is firmly attached to the upper end of the quartz rod 4 with its plane perpendicular to the plane of the holder 3. A mirror 10 is attached to this frame and is used to observe the rotation of the system. One end of the frame is soldered onto the
Card 1/3

S/120/63/000/001/032/072
E032/E314

Determination of

lower end of the suspension 5 , while the other end of the frame is soldered to a copper wire which forms a thermocouple junction with a constantan wire 14 at the holder 3 . The other end of the constantan wire is taken up through the glass-to-metal seal, forming a spiral around the suspension 5 . The necessary temperature is produced by placing the lower part of the tube in an electrical heater or a dewar. Thus, two leads are sufficient to determine the magnetization of the film by passing a compensating current through the coil 8 , the temperature being measured by the thermocouple. Fig. 3 shows the hysteresis loop for 2 650 Å thick nickel film on a glass base. The experimental points are in satisfactory agreement with the theoretical curves. There are 3 figures.

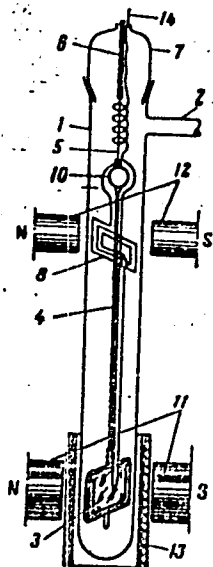
ASSOCIATION: Khar'kovskiy gosudarstvennyy universitet
(Khar'kov State University)

SUBMITTED: April 7, 1962

Card 2/3

Determination of the

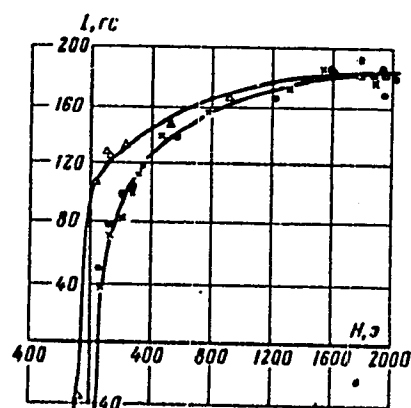
Fig. 1:



Card 3/5

S/120/63/000/001/032/072
E032/E314

Fig. 3:



21797

S/103/61/022/004/004/014
B116/B212

16.9500 (1041, 1121, 1132)

AUTHOR: Litovchenko, Ts. G. (Moscow)

TITLE: Analytic solutions of linear equations describing dynamic systems of a class with variable parameters

PERIODICAL: Avtomatika i telemekhanika, v. 22, no. 4, 1961, 457-465

TEXT: The present paper brings the solution of linear equations in a general form having linearly changing coefficients, which is obtained by operational calculus. Cases are separated where this solution can be obtained in a finite form, i.e., the solution is expressed by elementary functions and tabulated special functions. The class of equations having the form

$$\sum_{v=0}^{v=N} (a_v + b_v t) F_{v,t} x(t) = u(t) \quad (1)$$

is analyzed, where $F_{v,t}$ denotes a certain linear steady operator performing the following operations:

$$F_{v,t} x(t) = \int_0^t f_v(t - \tau) x(\tau) d\tau \quad (2).$$

Card 1/8

21/97

S/103/61/022/004/004/014
B116/B212

Analytic solutions ...

Fig. 1 shows the schematic diagram which corresponds to equation (1). For the special case with $f_v(t - \tau) = \delta(v+1)(t - \tau)$ equation (1) will have the form of a differential equation:

$$\sum_{v=0}^{v=N} (a_v + b_v t) x^{(v)}(t) = u(t) \quad (3).$$

The equations (1) resp. (3) are equations with singular points. These solutions may be represented by infinite power series but they are very involved. Therefore, all those cases are separated where the solutions may be obtained in a finite form. The problem is solved with a Laplace transformation, which is applied to equation (1) resp. (2) and a first order equation is obtained. The conditions where the representation obtained has an original are determined and also the original itself. Finally, all special cases are found where solutions in a finite (analytic) form are possible and also the solutions for the equations of type (1), independent of the nature of the $F_{v,t}$ operators and that for the equations of type (3), independent of the order of N . The Laplace transformation is applied to (1) which yields equation

$$\sum_{v=0}^N \left(a_v - b_v \frac{d}{dp} \right) F_v(p) X(p) = U(p). \quad (4),$$

Card 2/8

21797

S/103/61/022/004/004/014
B116/B212

Analytic solutions ...

where $F_v(p)$ denotes the representation of the transient function $f_v(t)$. If (1) has the form of (3): $F_v(p) = p^v$. Equation (4) is rearranged in $X'(p) + P(p) X(p) = Q(p)$ (5), where

$$P(p) = \frac{\sum_{v=0}^N b_v F_v(p)}{\sum_{v=0}^N b_v p_v(p)}, \quad Q(p) = - \frac{U(p)}{\sum_{v=0}^N b_v F_v(p)} \quad (6)$$

is valid. $P(p)$ is written as

$$P(p) = c_0 + \sum_{n=1}^N \sum_{m=1}^{M_n} \frac{c_{n,m}}{(p-p_n)^m}, \quad (7)$$

where p_n denote the poles of the function, N the number of poles, M_n the order of the n th pole and $c_{n,m}$ the coefficient of expansion determined from the formula

$$c_{n,m} = \lim_{p \rightarrow p_n} \frac{d^{M_n-m}}{dp^{M_n-m}} [(p-p_n)^{M_n} P(p)] \frac{1}{(M_n-m)!} \quad (8)$$

Card 3/8

21797

Analytic solutions ...

S/103/61/022/004/004/014
B116/B212

If (1) has the form of (3) the function $P(p)$ is equal to

$$P(p) = \frac{\sum_{v=0}^N v! b_v p^{v-1} - a_v p^v}{\sum_{v=0}^N b_v p^v} \quad (9)$$

The general solution of (5) is given as

$$X(p) = e^{-c_0 p} R^{-1}(p) \left[C + \int e^{c_0 p} V(p) dp \right] \quad (10)$$

From this expression the original $x(t)$ of the function $X(p)$ is obtained by utilizing the rule of convolution and the formula

$$J(t, m, n) = \sum_{\mu=0}^m \binom{m}{\mu} (-1)^\mu t^{m-\mu} \int_0^t \frac{\tau^{\mu+n}}{\tau - c_0} e^{a\tau} d\tau \quad (27)$$

$$x(t) = - \int_0^t r^*(t-\tau) \frac{v(\tau)}{\tau - c_0} d\tau \quad (14)$$

Card 4/8

21797

Analytic solutions ...

S/103/61/022/004/004/014
B116/B212

The $R(p)$ given in (10) have to be determined from formula

$$R(p) = \exp \left\{ \sum_{n=1}^N \sum_{m=1}^{M_n} \frac{c_{n,m}}{(p-p_n)^m} dp \right\} = \exp \left\{ \sum_{n=1}^N \sum_{m=1}^{M_n} \frac{c_{n,m}}{(p-p_n)^{m(m-1)}} + \right. \quad (13)$$

$$\left. + \sum_{n=1}^N c_{n,1} \ln(p-p_n) \right\} = \prod_{n=1}^N (p-p_n)^{c_{n,1}} \prod_{n=1}^N \prod_{m=2}^{M_n} e^{-\frac{c_{n,m}}{(m-1)(p-p_n)^m}} \quad (13)$$

and $V(p)$ from formula $V(p) = R(p) Q(p) \quad (12).$

$r^*(t)$ and $v(t)$ are the originals of the $R^{-1}(p)$ and $V(p)$, respectively. Formula (14) gives the general solution of (1) independent of the nature of the $F_{y,t}$ operators. Formula (13) shows the cases where the integral (14)

will be taken in a finite form, that is to say, where it is expressed by elementary and tabulated special functions. It is possible if the $c_{n,m}$ terms of the series (7) for $m \geq 2$ are zero and for $m=1$ real integers. In this case the function will be given as

$$R(p) = \prod_{n=1}^N (p-p_n)^{c_{n,1}} \quad (15),$$

Card 5/8

21797

S/103/61/022/004/004/014
B116/B212

Analytic solutions ...

a rational and fractional function. In order to get a general solution in a finite form from (1) resp. (3) it is necessary: (1) to setup the functions $P(p)$ and $Q(p)$ from (6) resp. (9); 2) to expand $P(p)$ in a series by using (7) and (8) and to establish a possibility to obtain the solution in a finite form according to the following conditions: The function $P(p)$ has no multiple poles, that is at $m \geq 2$ $c_{n,m} = 0$; $P(p)$ has no complex poles and its remainders $c_{n,1}$ are integers; 3) from (15) and (12) the functions $R^{-1}(p)$ and $V(p)$ have to be found and from

$$B_s = \lim_{p \rightarrow \infty} \frac{1}{p^s} \left[R^{-1}(p) - \sum_{x=s+1}^S B_x p^x \right], \quad (18) \quad (18)$$

$$q_{i0} = \lim_{p \rightarrow p_i} \frac{d^{\theta_i - \theta}}{dp^{\theta_i - \theta}} [(p - p_i)^{\theta_i} V(p)] \frac{1}{(\theta_i - \theta)!}; \quad (19) \quad (19) \text{ and}$$

$$A_j = \lim_{p \rightarrow \infty} \frac{1}{p^j} \left[V(p) - \sum_{x=j+1}^J A_x p^x \right]. \quad (20) \quad (20)$$

Card 6/8

21797

Analytic solutions ...

S/103/61/022/004/004/014
B116/B212

the coefficients of expansion $\varepsilon_{k,l}$, B_s , $q_{i,j}$, A_j have to be calculated for the expansion in (18); 4) from

$$x(t) = \frac{1}{c_0} \sum_{j=0}^J A_j \left[\sum_{s=0}^S B_s \delta^{(s+j+1)}(t) + \sum_{k=1}^K \sum_{l=1}^{L_k} \frac{\varepsilon_{k,l}}{(l-1)!} \frac{d^j}{dt^j} \left(e^{p_k t} t^{l-1} \right) \right] -$$

$$- \sum_{i=1}^I \sum_{j=1}^{\theta_i} \frac{q_{i,j}}{(j-1)!} \left[\sum_{s=0}^S B_s \frac{d^s}{dt^s} \left(\frac{e^{p_1 t} t^{j-1}}{t - c_0} \right) + \sum_{k=1}^K \sum_{l=1}^{L_k} \frac{\varepsilon_{k,l}}{(l-1)!} e^{p_k t} J_{lk}(t, l-1, p_k) \right] \quad (22)$$

the final solution of (1) resp. (3) has to be obtained. p_k denotes the poles of $R^{-1}(p)$, p_1 that of $V(p)$; K the number of poles of $R^{-1}(p)$ and I that of $V(p)$; L_k represents the order of the k th pole, θ_i that of the i -th pole; S denotes the difference between the order of the numerator of the function $R^{-1}(p)$ and that of the denominator and J denotes the difference between the order of the numerator of $V(p)$ and that of the denominator. Since the calculation is very difficult at a large number of terms of a series (at large values of c_n) if expression (22) is used, an approximation method has been

Card 7/8

21797

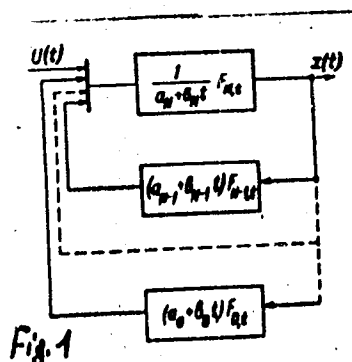
S/103/61/022/004/004/014
B116/B212

Analytic solutions ...

suggested. This method is based on a graphic calculation of the convolution integral (14) where $r(t)$ and $v(t)$ are determined previously, e.g., by means of trapezoidal frequency characteristics. There are 3 figures and 7 Soviet-bloc references.

SUBMITTED: June 1, 1960

Fig. 1



Card 8/8

240a2

S/103/61/022/008/011/015
D274/D302

16,3000 (003) 1133, 1433
AUTHORS: Litovchenko, Ts.G. and Yakovenko, Yu.P. (Moscow)

TITLE: Analytical and structural description of mechanical transmission in automatic control systems with restrictions and backlashes

PERIODICAL: Avtomatika i telemekhanika, v. 22, no. 8, 1961, 1100-1107

TEXT: An attempt is made at a simple structural description of backlashes and restrictions, all the essential features of collision effects and elastic properties of mechanical transmission with backlashes and restrictions being taken into account. The method proposed makes it possible to carry out grapho-analytic computations and simulation in a sufficiently simple way; previous methods did not have this advantage. Equations are derived which describe the rotation of two bodies which are divided by a backlash, elastic properties being taken into account. A block diagram of the system described by the equations is given. It is simple and can be readily

Card 1/3

255L2

S/103/61/022/008/011/015
0274/0302

Analytical and structural...

simulated, without requiring the computation of initial conditions in passing from separate motion of elements to joint motion. If the relationship between the moment M (between the bodies) and the elastic deformation δ (which takes account of the backlash) is non-linear, the structural diagram remains the same with the exception of the non-linear unit (where half-lines are replaced by curves). If the inertial and position moments are absent, the backlashes are described by hysteresis loops (in the case of infinitely great rigidity of transmission). Restrictions in the motion of elements of mechanical transmission can be considered as particular cases of backlash. In the structural diagram of motion with restrictions, a non-linear characteristic of dead-zone type is found in the feedback circuit. Influence of internal forces of dissipation is examined. Energy is dissipated by collisions. An accurate description of this effect is very complicated. However, for structural description a simplified picture is sufficient. It is assumed that plastic deformations do not occur, hence the dissipation is a function of elastic deformations only. This relationship can be given in two ways: a) It is assumed that the dissipation force is directly proportional to

Card 2/3

24842

Analytical and structural...

S/103/61/022/008/011/015
D274/D302

the rate of elastic displacement of one body with respect to the other; b) The energy dissipated by the collision of two bodies is proportional to the absolute length of elastic displacement between the two bodies. It is possible to use a similar method for calculating energy dissipation by other elastic deformations of control-system elements, (not only by backlashes and restrictions). Examples are given which illustrate the method on systems with backlashes. There are 6 figures and 4 Soviet-bloc references.

SUBMITTED: June 1, 1960

Card 3/3

L 14361-63 EWP(q)/EWP(m)/BDS AFFIC/ASD JD/RDW
 ACCESSION NR: AP3000102 8/0126/63/015/004/0592/0596

AUTHORS: Palatnik, I. S.; Gladkikh, N. T.; Litovchenko, T. T.

TITLE: Effect of component concentration on condensation of alloys with varied composition

SOURCE: Fizika metallov i metallovedeniye, vol. 15, no. 4, 1963, 592-596

TOPIC TAGS: alloy, component, condensation, Sb-Se, Zn-Se, Cd-Se

ABSTRACT: Alloys of varied composition, the components of which are mutually soluble in a liquid state and insoluble in a solid state, as well as alloys with totally insoluble components in both states were studied. These alloys were the binary systems of Sb-Se, Zn-Se and Cd-Se. Samples 50-100 microns thick were made by a simultaneous evaporation of the components and their condensation on a glass plate at room temperature. Subsequently they were subjected to microhardness and X-ray tests. Three sharply defined zones were observed in the Sb-Se alloys: the specular end areas (zones I and III) of an amorphous alloy, and an opaque middle area (zone II) of crystalline Sb. The microhardness variation in these areas is shown in Fig. 1 (see Enclosure 1). The Zn-Se and Cd-Se also showed a dark opaque zone II. The alloys rich in Zn or Cd had a light, slightly opaque zone I. Alloys

Card 1/5

L 14301-63

ACCESSION NR: AP3000102

rich in Se had a specular zone III. The microhardness of the zones differed sharply. Its variation in the Zn-Se alloy is shown in Fig. 2 and that of Cd-Se in Fig. 3 (see Enclosures). The authors conclude that the variation in the component concentration affects the stability of oversaturated amorphous solutions as well as the transition from one condensation mechanism (vapor \rightarrow crystal) to the other (vapor \rightarrow liquid). The influence of the element concentration is as strong as the effect of temperature variation. Orig. art. has: 5 figures and 1 table.

ASSOCIATION: Kher'kovskiy gosudarstvennyy universitet im. A. M. Ger'shogo
(Khar'kov State University)

SUBMITTED: 24 Aug 62

DATE ACQ: 12 Jun 63

ENCL: 03

SUB CODE: ML

NO REF SOV: 005

OTHER: 001

Card 2/52

ACCESSION NR: AP4028429

S/0181/64/006/004/1051/1061

AUTHOR: Litovchenko, V. A.

TITLE: Computation of penetration depth and thermoelectric effect for anisotropic superconductors

SOURCE: Fizika tverdogo tela, v. 6, no. 4, 1964, 1051-1061

TOPIC TAGS: penetration depth, thermoelectric effect, superconductor, Pippard tensor, Fermi level, magnetic field

ABSTRACT: The author considers two types of superconductors--with open and closed Fermi levels. The cylinder is an example of the first, the ellipsoid of rotation of the second, as considered here. A connection is found between the current and the potential vector in the two models, and an expression is obtained for Pippard's tensor, on the assumption that the wave functions of the electrons in a metal are plane waves. The assumption is crude, but stricter analysis shows that a closer approximation differs from the value obtained here by only a constant factor. Having obtained this tensor, the author finds the penetration depth of the magnetic field in a semi-infinite superconductor. The connections between current and potential vector are then used to solve the problem of the thermoelectric effect on

Card 1/2

ACCESSION NR: AP4028429

an infinite superconducting layer. It is shown that the total current differs from zero when the temperature gradient has a definite relation to the coordinates. Computations show that when the temperature gradient does not depend on the coordinates, the magnetic field and the current return to zero. "The author considers it his pleasant duty to express his thanks to E. T. Gaylikman and V. L. Ginzburg for proposing the problem, to V. Z. Kresin for his aid in the work and for reading the manuscript, and to L. V. Keldy*sh for valuable discussions of some of the problems." Orig. art. has: 51 formulas.

ASSOCIATION: Universitet druzhby* narodov im. Patrisa Lumumby*, Moscow (University of Friendship of the People)

SUBMITTED: 08Oct63

DATE ACQ: 27Apr64

ENCL: 00

SUB CODE: SS, EM

NO REF SOV: 003

OTHER: 000

Card 2/2

ACC NR: AP6032550

SOURCE CODE: UR/0139/66/000/004/0171/0173

AUTHOR: Petrakovskiy, G. A.; Litovchenko, V. F.

ORG: Siberian Physicotechnical Institute im. V. D. Ku tsov (Siberskiy fiziko-
te hnic eskiy institute)

TITLE: Magnetic characteristics of yttrium-gallium and yttrium-gallium-gadolinium
ferrites

SOURCE: IVUZ. Fizika, no. 4, 1966, 171-173

TOPIC TAGS: thermostable magnetization, SHF ferrite device, yttrium, gallium,
gadolinium, ferromagnetic resonance, *ferrite, magnetic property, magnetization*

ABSTRACT: Measurement results of some magnetic properties of yttrium-gallium and
yttrium-gallium-gadolinium ferrites are presented. These ferrites are of special
interest from the point of view of the possibility of obtaining materials with thermo-
stable magnetization [at comparatively high Curie temperature] and low value of
magnetization within the range of thermostability. Sixteen ferrite samples were pre-
pared according to standard technological methods. The following parameters were
measured: apparent density, line width of ferromagnetic resonance of uniform magneti-
zation precession ΔH_0 by 10 cm at room temperature, lattice constant, and magnetiza-
tion of saturation $4\pi M$ depending on temperature. Measurements of the relationship
between the line width of ferromagnetic resonance and temperature were also taken

Card 1/2

ACC NR: AP6032550

for a number of ferrites. Results of temperature relationship measurements for yttrium-gallium ferrites magnetization showed that magnetization decreases sharply as gallium content increases from $x = 0.00$ to $x = 0.20$. Apparent density rises linearly with the increase of gallium content from 4.25 at $x = 0.00$ to 4.75 at $x = 0.20$. Lattice constant decreases linearly from 12,376 Å at $x = 0.00$ to 12,358 Å at $x = 0.20$. Similar measurements for yttrium-gallium-gadolinium ferrites revealed magnetization compensation points on the magnetization temperature curve; the position of these points can be adjusted by varying the gallium content. Ferrites with $x = 0.10$ and $x = 0.15$ are magnetically thermostable. The lattice constant rises when yttrium is substituted for gadolinium. The reverse phenomenon takes place if gallium is substituted for iron in the ferrites of formulas (2). The density of all the ferrites was approximately $5.05 \text{ g}\cdot\text{cm}^{-3}$. SHF measurements showed that for all ferrites the line with ΔH_0 rises when the content of gallium and gadolinium increases, and the value of ΔH_0 does not surpass 240 oe. Orig. art. has: 3 figures.

SUB CODE: 20/ SUBM DATE: 15Apr65/ ORIG REF: 001/ OTH REF: 002/

Card 2/2

86103

26.2420

9.4177

S/112/59/000/012/014/097
A052/A001

Translation from: Referativnyy zhurnal, Elektrotehnika, 1959, No. 12, p. 12,
24005

AUTHORS: Lashkarev, V.Ye., Litovchenko, V.G., Omel'yanovskaya, N.M., Bondaren-
ko, R.M., Strikha, V.I.

TITLE: Dependence of the Life Time of Minority Charge Carriers²¹ on Concentration of Antimony Admixture in Germanium²¹

PERIODICAL: Nauk. shchorichnyk. Radiofiz. fak. Kyivs'k. un-tu, 1956, Kyiv, 1957, pp. 495-496 (Ukrainian)

TEXT: The dependence of the life time τ of minority charge carriers on the concentration of Sb up to the values approaching the solubility limit of Sb in Ge ($n = 4 \cdot 10^{18} \text{ cm}^{-3}$) has been studied. The concentration has been determined from the Hall effect, τ has been measured by optical methods. It has been established that with n increasing from $5 \cdot 10^{15}$ to 10^{15} cm^{-3} , the life time was inversely proportional to n (τ decreased from 300 to 15 microseconds). At a further increase

Card 1/2

86103

S/112/59/000/012/014/097
A052/A001

Dependence of the Life Time of Minority Charge Carriers on Concentration of Antimony Admixture in Germanium

of n the inverse proportionality did not hold and τ changed more slowly, attaining ~ 2.5 microseconds at $n = 5 \cdot 10^{17} \text{ cm}^{-3}$. At n increasing up to $4 \cdot 10^{18} \text{ cm}^{-3}$ the life time showed no noticeable decrease. When computing τ from the formula $D\tau = l_0^2$ the dependence of D on n was taken into account; at high values of n this dependence becomes strong. The found dependence of τ on n agrees with the Shockley-Reed recombination theory. There are 5 references. ✓

A.F.A.

Translator's note: This is the full translation of the original Russian abstract.

Card 2/2

AUTHORS: Lashkarev, V. Ye., Litovchenko, V. G., 57-11-2/33
Omel'yanovskaya, N. M., Bondarenko, R. N., Strikha, V. I.

TITLE: Lifetime Dependence of Foreign Current Carriers upon Concentration of Antimony Admixture in Germanium (Zavisimost' vremeni zhizni storennikh nositeley toka ot kontsentratsii primesi sur'my v germanii).

PERIODICAL: Zhurnal Tekhn. Fiz., 1957, Vol. 27, Nr 11, pp. 2437-2439 (USSR).

ABSTRACT: The dependence of lifetime τ of the antimony concentration admixture is investigated up to the boundary which lies near the solubility boundary of antimony in germanium $n \approx 4 \cdot 10^{18} \text{ cm}^{-3}$ at a great number of germanium patterns. τ was measured by means of optical methods. It is shown that in the case of an increase of the antimony admixture concentration of from $n = 5 \cdot 10^{13} \text{ cm}^{-3}$ to $n = 10^{15} \text{ cm}^{-3}$ it was again confirmed that τ is inversely proportional to n . In the case of a further increase of the concentration this is disturbed, is slowly reduced and reaches the value $\tau \approx 2,8 \mu\text{sec}$ at $n = 5 \cdot 10^{17} \text{ cm}^{-3}$. This value scarcely changes in the case of a further increase of n up to the maximum concentrations ($n = 4 \cdot 10^{18} \text{ cm}^{-3}$). It is shown that

Card 1/2

57-11-2/33

Lifetime Dependence of Foreign Current Carriers upon Concentration of Antimony
Admixture in Germanium.

the independence of the lifetime τ of n at great n follows immediately from the recombination theory of W. Shockley and W. Read a fact which was also observed here in the investigations. It is furthermore shown that in this case the deep-lying levels are responsible for the recombination. The conclusion can be drawn that the admixture atoms of the antimony are not immediately the effective recombination centres. Apparently the not controllable, deeper lying admixtures are responsible for the recombination. These admixtures are introduced either together with the antimony or they are already present in the germanium initial material. The introduction of antimony leads to an alteration of the position of the Fermi-level i. e. of the ionization degree of this recombination level which leads, however, to the increase of the recombination probability.

There are 2 figures and 3 Slavic references.

ASSOCIATION: Kiyev State University (Kiyevskiy gosudarstvennyy universitet).

SUBMITTED: April 15, 1957.

AVAILABLE: Library of Congress.

Card 2/2

s/058/62/000/006/087/136
A057/A101

AUTHORS: Litovchenko, V. G., Strikha, V. I., Bondarenko, R. M.

TITLE: The effect of slow relaxation photo-emf of a point contact on germanium

PERIODICAL: Referativnyy zhurnal, Fizika, no. 6, 1962, 37, abstract 6E298
("Visnik Kyivs'k. un-tu", 1958, no. 1, ser. fiz. ta khimii, v. 1, 123 - 128, Ukrainian; Russian summary)

TEXT: A slow exponential change in the photo-emf of a point collector on n- and p-Gc was observed after the start (or stop) of illumination ($\tau \approx 5 - 1,000$ sec.). The slow change of the photo-emf on non-molded contacts attained 40% and more of the steady value. Thus the readings have to be made after a time $\gg \tau$ in the common methods of measuring the length of diffusion, in order to avoid errors. The time of relaxations depends considerably upon the specific resistance ($\tau \approx 60\rho^{1/2}$) sec. and the condition of the surface (it decreases with aging of the surface, adsorption of ethanol vapors, and molding). The surface nature of the observed effect is demonstrated, therefore the surface

Card 1/2

S/058/62/000/006/087/136
A057/A101

The effect of...

electron system participates directly in the formation of a point Ge-detector. ✓

V. Litovchenko

[Abstracter's note: Complete translation]

Card 2/2

LITOVCHENKO, V. G.

41949

S/194/62/000/009/056/100
D295/D308

9.4340

AUTHORS: Strikha, V. I., Bondarenko, R. M., Omel'yanovs'ka,
N. M. and Lytovchenko, V. H.

TITLE: The influence of specific resistivity and carrier
life time on the current sensitivity of centimeter
range detectors

PERIODICAL: Referativnyy zhurnal, Avtomatika i radioelektronika,
no. 9, 1962, 12, abstract 9-4-23 g (Visnyk Kyivs'k.
un-tu, Ser. fiz. ta khimiyi, no. 1, 1958, 143-144
(Ukr.; summary in Rus.))

TEXT: One of the most important parameters of microwave detectors
is their current sensitivity β . In germanium this quantity depends
on current, d.c bias, doping and resistivity of the materials. In
alloying germanium with antimony the best results have been ob-
tained for samples with resistivity of $0.003 - 0.01 \Omega \times \text{cm}$. The de-
pendence of parameters of microwave detectors on the life time of
minority carriers and on the resistivity of the material is estab-

Card 1/2

The influence of specific ...

S/194/62/000/009/056/100
D295/D308

lished. Detectors of germanium alloyed with Sb, Fe and Ga have been fabricated. The measurements of resistivity were carried out by the usual compensation method, and the measurement of life time by using Valdesse and Adam's setup. Current sensitivity was determined over a wide wave-length range (3 - 70 cm). The results of the investigation have shown that the resistivity of the material, and not the volume life-time of minority carriers, contributes principally to the variation of current sensitivity of centimeter range receiving detectors. 4 references. [Abstracter's note: Complete translation.]

Card 2/2

41027

S/058/62/000/009/067/069
A057/A101

7.4.40
AUTHORS: Strikha, V. I., Bondarenko, R. M., Omel'yanovs'ka, N. M., Litovchenko, V. G.

TITLE: The effect of the specific resistance and life time of carriers on the current sensitivity of detectors of the centimeter range

PERIODICAL: Referativnyy zhurnal, Fizika, no. 9, 1962, 12, abstract 9-4-23g ("Visnik Kiyvs'k. un-tu", 1958, no. 1, ser. fiz. ta khimiy, v. 1, 143 - 144, Ukrainian; summary in Russian)

TEXT: One of the most important parameters of a superhigh-frequency reception detector is the current sensitivity β . This value depends in germanium upon the current, the displacement constant, the introduced admixtures, and the specific resistance of the materials. Alloying germanium with antimony best results were obtained for samples with a specific resistance of 0.003 - 0.01 ohm-cm. Dependences of the parameters of superhigh-frequency detectors upon the life time of minority carriers and the specific resistance of the material are clarified. Detectors of germanium, alloyed with Sb, Fe, and Ga were prepared.

Card 1/2

The effect of the...

S/058/62/COO/009/067/069
A057/A101

The measurement of the specific resistance was carried out by means of a common compensation circuit, the measurements of the life time - on devices of the type Waldes and Adam. The current sensitivity was determined in a wide wavelength range of 3 - 70 cm. The results of the investigation demonstrated that the basic role in the change of the current sensitivity of reception detectors of the centimeter range is played by the specific resistance of the material, and not the volume lifetime of minority current carriers. There are 4 references.

A. G.

[Abstracter's note: Complete translation]

Card 2/2

AUTHORS: Lyashenko, V. I., Litovchenko, V. G. 57-28-3-2/33

TITLE: The Influence Exerted by the Adsorption of Molecules Upon the Work Function and the Conductivity of Germanium. I
(Vliyaniye adsorbtsii molekul na rabotu vykhoda i provodimost' germaniya. I)

PERIODICAL: Zhurnal Tekhnicheskoy Fiziki, 1958, Vol. 28, Nr 3, pp. 447 - 453 (USSR)

ABSTRACT: The influence of the adsorption was here investigated at the germanium surface etched (as is usually done in the production of instruments) and at a germanium surface purified as much as possible (e. g. by means of heating in a vacuum). The influence of the adsorption of dipole-molecules (alcohol, acetone, carbon monoxide) and non-dipole-molecules (benzene, oxygen) upon the work function and the conductivity of germanium was investigated. The method of investigation was similar to that employed by the authors in references 1 to 3. The work function was measured by means of the vibration-meter for the potential-contact-gradient developed in the laboratory. According to its nature it is a Thomson method

Card 1/ 4

The Influence Exerted by the Adsorption of Molecules Upon 57-28-3-2/33
the Work Function and the Conductivity of Germanium. I

transformed into electronics. The electric conductivity was measured according to the compensation-probe-method. The measurements were performed on 16 monocrystal plates with electron-, hole- and intrinsic conductivity and specific resistance $\rho = 7 - 55 \text{ ohm.cm}$ and a eigen time $\tau = 100 - 1000 \text{ } \mu\text{sek}$. The results of measurement show that by the adsorption of dipole as well as non-dipole molecules the work function decreases. An exception is only made by oxygen whose work function is usually increased by the adsorption, although sometimes, especially in germanium with hole-conductivity, a slight decrease in the work function was observed. The modifications of the work function and of the resistance in highly resistive samples are higher than those in low-resistance ones. These modifications increase with increasing pressure of the adsorbed vapors. In the case of saturated vapor pressures a liquid-film forms at the germanium surface and a high modification of $\Delta\varphi$ is observed. $\Delta\varphi$ denotes the modification of the work function. $\Delta(R)(p)$ - (modification of resistance, caused by the molecule-adsorption) has an analogous nature, but depends on the type of electric conductivity of germanium. In germanium with electron-

Card 2/4

The Influence Exerted by the Adsorption of Molecules Upon
the Work Function and the Conductivity of Germanium. I

57-28-3-2/33

-conductivity the resistance decreases in the case of adsorption of vapors, in germanium with a hole-conductivity it increases. This correlation between the modification $\Delta\varphi(p)$ and $\Delta R(p)$ and the type of conductivity also continues when the work function increases due to oxygen adsorption. In this case the resistance of the samples with electron-conductivity increases, whereas it decreases in samples with a hole-conductivity. The nature of the adsorbed molecules (with the exception of oxygen) does not influence the sign of the work-function modification and of the conductivity, but considerably influences the amount of its modification. The experiments were performed at room and elevated temperatures. The quantity $\Delta\varphi$ markedly decreases with a rise of temperature, its sign remaining negative. An exception was made by oxygen by which the sign changed and $\Delta\varphi$ considerably increased (with a rise of temperature). - The results of the measurements performed here yield the possibility by using the paper by Garret and Brattain (reference 6) to estimate the values of the surface potential V_s and to compare them with the observed values of ΔV_s .

Card 3/4

The Influence Exerted by the Adsorption of Molecules Upon the Work Function and the Conductivity of Germanium. I 57-28-3-2/33

It is shown that as well in p- as in n-germanium in the case of the adsorption of different molecules V_s approaches the space-potential. An exception is made by dry oxygen in which V_s derives from the space-potential. The work was discussed with V. Ye. Lashkarev, Division Manager, Member of the AS Ukrainian SSR, and K. B. Tolpygo. A. N. Kvasnitskaya and E. B. Mertens placed the crystals at the authors' disposal. There are 7 figures, 3 tables, and 6 references, 4 of which are Soviet.

ASSOCIATION: Institut fiziki AN USSR, Kiyev
(Kiyev Institute for Physics AS Ukrainian SSR)

SUBMITTED: July 19, 1957

1. Germanium---Conductivity
2. Germanium---Adsorptive properties
3. Molecules---Adsorption
4. Work functions

Card 4/4

57-28-5-3/33

AUTHORS: Lyashenko, V. I. , Litovchenko, V. G.

TITLE: The Influence Exerted by the Adsorption of Molecules Upon the Work Function and the Conductivity of Germanium (Vliyaniye adsorbtsii molekul na rabotu vykhoda i provodi.. most' germaniya) II. The Kinetics of the Process (II. Kinetika protsessy)

PERIODICAL: Zhurnal Tekhnicheskoy Fiziki, 1958, Vol.28, Nr 3, pp.454-459 (USSR)

ABSTRACT: The authors here investigated the kinetics of the modification of the work function and that of the conductivity in germanium in the case of adsorption of molecules. The eigen time of the process and its dependence on the vapor pressure and -temperature were determined. The measurement was made in the same apparatus and according to the same method as in Reference 1. The same samples were used as well. The kinetics of the process depend on the surface treatment of germanium. A steady value for the work function was obtained

Card 1/4

54

57-28-3-3/33

- The Influence Exerted by the Adsorption of Molecules Upon the work function and the Conductivity of Germanium. II. The Kinetics of the Process

within 200 - 250 sec. in the case of a surface etched in perhydrol, and within 400 - 500 sec. in the case of a surface etched in perhydrol with nitric acid and heated in a vacuum. The analysis of the obtained curves for the modification of the work function shows that beside the rapid process also observed in other semiconductors a continuous process also takes place. This latter follows the exponential law

$$\Delta\varphi = \Delta\varphi_{st}(1 - e^{-t/\tau}), \text{ where } \Delta\varphi_{st} \text{ denotes the}$$

stabilized value of the modification of the work function.

τ denotes the eigen time. It is shown that τ varies within a wide range in dependence on the pressure of the adsorbed vapors and on temperature. $\tau(p)$ can be represented as a hyperbola $\tau = \frac{1}{ap^n}$. Here $n \approx 0,5$ and does not

depend on the nature of the adsorbed molecules, whereas the coefficient a depends on them. It is shown that $\tau(p)$ in degasification of the surface remains equal, the quantity τ itself, however, is modified. At more degassed surfaces τ

Card 2/4

57-28-3-3/33

The Influence Exerted by the Adsorption of Molecules Upon the Work Function and the Conductivity of Germanium. II. The Kinetics of the Process

was smaller. The results of the experiments showed that the establishment of the equilibrium in the case of adsorption is rendered difficult. As was already said in reference 1 a high surface potential exists at the surface of the germanium samples used here, which is apparently due to the occurrence of an oxide layer. Therefore it is assumed that the time effects observed here are due to the transition of the electrons to the surface of the sample through such a barrier layer. The continuous process observed here is in the authors' opinion connected with the production of the equilibrium at the external surface levels. A long eigen time τ was observed here. It is possible that a short time connected with the inner levels also exists. But by means of the method employed here it is not possible to investigate the kinetics of the short-time effects.

The work was discussed with V. Ye. Lashkarev, Division Manager, Member of the AS Ukrainian SSR, and K. B. Tolpygo. There are 8 figures, and 8 references, 1 of which is Soviet.

Card 3/4

57-28-3-3/33
The Influence Exerted by the Adsorption of Molecules Upon the Work Function and the Conductivity of Germanium. II. The Kinetics of the Process

ASSOCIATION: Institut fiziki AN USSR, Kiyev
(Kiyev Institute for Physics AS Ukrainian SSR)

1. Germanium---Conductivity 2. Molecules---Adsorption 3. Germanium
---Adsorptive properties 4. Work functions 5. Germanium---Vapor
pressure 6. Germanium---Temperature factors

Card 4/4

66342

SOV/181-1-10-17/21

~~24(6)~~ 24.7700

AUTHORS: Litovchenko, V. G., Lyashenko, V. I.

TITLE: Investigation of "Rapid" Surface States of Germanium

PERIODICAL: Fizika tverdogo tela, 1959, Vol 1, Nr 10,
pp 1609 - 1621 (USSR)

ABSTRACT: The method used here is similar to that described in references 3 and 4. A square pulse field was applied to the measuring condenser. The two plates of the condenser were made up of the sample and a metallic plate. A mica layer of equal thickness up to some μ separated the two plates. In order to calculate the charges resulting from the induced field, the authors measured the condenser capacity by means of a Coulomb meter. Parasitic capacities in the range to be measured were eliminated by compensation. The square pulses were produced by a multivibrator with a variable reciprocal of the pulse duty factor, which generated at the output a 150-v tension of both polarities with a duration of 500 μ sec approximately. The p-germanium foil (15.5.0.3 mm³, $\rho = 20-30 \Omega \cdot \text{cm}$, $\tau = 200-1000 \mu\text{sec}$, $s = 50-300 \text{ cm/sec}$) was cut of the crystal perpendicular to the (110)-axis, etched in SP-4 and hydrogen peroxide, washed in distilled water and stored in air for some months to form

Card 1/2

66342

Investigation of "Rapid" Surface States of Germanium SOV/181-1-10-17/21

a stable surface. The dependence $\Delta\sigma_{II} : Q_{si}$ was measured in vacuum ($\sim 10^{-6}$ torr) and air at various constant transverse field strengths (Figs 1-4). The parameters of the "rapid" surface states were calculated for the various experimental conditions with the help of the afore-mentioned curves (Fig 5, Tables 1-4). Final digest: 1) The short action of even very strong constant fields does not affect the parameters N_I and N_{II} of the samples. 2) A constant transverse field does not greatly change the parameters N and E up to field strengths $\leq (0.5-1) \cdot 10^5$ v/cm. 3) At field strengths $> (0.5-1) \cdot 10^5$ v/cm, the parameters of the "rapid" surface states vary whereas their energy states remain unaffected. 4) The concentration of the levels III and IV remains constant. 5) As regards the sign of E_p , asymmetry is to be observed with respect to the effect exerted by the constant field on the parameters N_I and N_{II} . 6) Parameter N_I is affected by the adsorption of dry air. This indicates that there is a direct relationship between O_2 and level I. There are 5 figures, 4 tables, and 9 references, 4 of which are Soviet.

ASSOCIATION: Institut Fiziki AN USSR (Institute of Physics of the AS UkrSSR)
 SUBMITTED: February 26, 1959
 Card 2/2

IASHKAREV, V.Ye. [Iashkar'ov, V.IE]; BONDARENKO, R.N. [Bondarenko, R.M.];
DOBROVOL'SKIY, V.N. [Dobrovol's'kiy, V.M.]; ZUBRIN, G.P. [Zubrin, H.P.];
LITOVCHENKO, V.G. [Lytovchenko, V.H.]; STRIKHA, V.I.

Properties of germanium containing beryllium admixtures. Ukr. fiz.
zhur. 4 no.3:372-375 My-Je '59. (MIRA 13:2)

1.Kiyevskiy gosudarstvennyy universitet im. T.G. Shevchenko.
(Germanium) (Beryllium)

LITOVCHENKO, V.G. [Lytovchenko, V.H.]

Calculation of the velocity of surface recombination and of the bulk
lifetime of carriers in the case of nonsymmetrical boundary conditions.
Ukr. fiz. zhur. 4 no.3:376-383 My-Je '59. (MIRA 13:2)

1. Institut fiziki AN USSR.
(Semiconductors)

LYASHENKO, V.I.; LITOVCHENKO, V.G. [Lytovchenko, V.H.]; SAMBUR, I.G.
[Sambur, I.H.]

Surface states of germanium. Ukr.fiz.zhur. 4 no.4:465-471
Jl-Ag '59. (MIRA 13:4)

1. Institut fiziki AN USSR, kafedra poluprovodnikov Kiyevskogo
gosudarstvennogo universiteta.
(Germanium)

LITOVCHENKO, V. G., CAND PHYS-MATH SCI, "INVESTIGATION
OF ~~THE~~ PHYSICAL PROPERTIES OF THE REAL SURFACES OF SILICA
AND GERMANIUM. KIEV, 1960. (MIN OF HIGHER AND SEC. SPEC
ED UKSSR. KIEV ORDER OF LENIN STATE UNIV IM T. G. SHEV-
CHENKO). (KL, 2-61, 199).

LITOVCHENKO, V. G. , SNITKO, O. V. and LYASHENKO, V. I.

"Electron States on Si and Ge Surface."

report presented at the Intl. Conf. on Semiconductor Physics, Prague,
29 Aug - 2 Sep 1960

Inst. of Physics, Acad. Sci. Kiev, Ukr SSR

*Litovchenko, V. G.*81948
S/181/60/002/04/06/034
B002/B063

24.7700

AUTHORS: Litovchenko, V. G., Snitko, O. V.TITLE: Surface Properties of Silicon

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 4, pp. 591-604

TEXT: From n-type silicon single crystals, plates were cut perpendicular to the [111] direction and etched with a polishing etching agent. Four indium electrodes were attached to the plate, and a thin mica foil together with a metal electrode were applied to one side. The circuit diagram of the measuring arrangement is reproduced in Fig. 1. Oscilloscopes of the types 25M (25I) and 30-53 (EO-53) were used for the measurements. The authors investigated the effect of the outer electric field on the conductivity of silicon and the kinetics of the field effect, the effect of a constant electric field on surface recombination and the effect of a constant electric field on the capacitor emf. Summing up: The chemically treated silicon surface has a complicated system of surface levels, five fast ones and three slow ones. The main differences between silicon and germanium are the following: The concentration of the fast surface levels

Card 1/2

X

Surface Properties of Silicon

81948
S/181/60/002/04/06/034
B002/B063

is higher; the outermost levels are, energetically, at a greater distance from the center of the forbidden band; surface adhesion levels arise. The authors thank Professor V. I. Lyashenko and the co-workers of the Laboratoriya poverkhnostnykh yavleniy (Laboratory for Surface Phenomena) for their advice and critical remarks. V. Ye. Lashkarev is also mentioned. There are 10 figures, 2 tables, and 40 references: 21 Soviet, 1 Czech, 6 American, 11 British, and 1 Japanese.

ASSOCIATION: Institut fizika AN USSR, Kiyev
(Institute of Physics of the AS UkrSSR, Kiyev) X

SUBMITTED: July 14, 1959

Card 2/2

Litovchenko, V. G.

81886

S/181/60/002/05/05/041
B008/B058

24.7700

AUTHORS: Litovchenko, V. G., Snitko, O. V.
TITLE: Long-time Changes of the Field Effect in Silicon
PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 5, pp. 815-822

TEXT: The authors investigated long-time ($t > 10$ sec) changes of the field effect on silicon as dependent on its (gaseous) medium, for the purpose of clarifying the cause of this effect. Plates of n-type silicon with a resistivity of from 30-200 ohm.cm, which were cut perpendicularly to the (111) direction, were used. Their preparation and the experimental arrangement are described in short. The authors showed that the main cause of long-time changes of the field effect is to be looked for in the presence of water vapor in the air. Experiments carried out in dry air or in vacuo (Figs. 1, 2 - vacuum) showed that these changes were almost entirely absent or less than 5-10%. A new effect occurring by the application of very strong fields ($> 1.2 \cdot 10^6$ v/cm) was, however, discovered. A sudden and steep increase of the long-time changes becomes evident, and an after-effect occurs after the disconnection of the field (which is described as a critical one): The samples show an additional

Card 1/3

Long-time Changes of the Field Effect
in Silicon

81886

S/181/60/002/05/05/041

B008/B058

surface conductivity above the common "quasi-surface" conductivity in the volume-charge layer. All samples located in fields above the critical one showed a change in conductivity σ of up to 20%, which was maintained for a long time after the disconnection of the field. It is stated in conclusion that the experiments led to the following results: Long-time changes of the field effects are due to the presence of water vapor in air, which is adsorbed on the silicon surface and leads to the occurrence of ionic conductivity the relaxation of which effects a slow change of σ . The after-effect to be observed after the disconnection of fields stronger than the critical one, which is the consequence of additional surface conductivity, can be maintained up to 24 hours and longer. The authors are of the opinion that this effect might be connected with the conductivity of an outer oxide surface. In fields V , which are stronger than or equal to the critical one, the curves $\sigma(V_v)$ take a similar course in vacuo. This

indicates that the parameters of the surface levels of silicon are not changed by the application of sufficiently strong fields. The authors finally thank Professor V. I. Lyashenko for his advice and discussions. There are 6 figures and 11 references: 6 Soviet and 5 English.

Card 2/3

Long-time Changes of the Field Effect
in Silicon

81886

S/181/60/002/05/05/041
B008/B058

ASSOCIATION: Institut fiziki AN USSR, Kiyev
(Physics Institute AS UkrSSR Kiyev)

SUBMITTED: August 3, 1959

Card 3/3

Litovchenko, V. G.

S/181/60/002/007/032/042
B006/B060

AUTHORS: Litovchenko, V. G., Lyashenko. V. I.

TITLE: Investigation of the Kinetics of Fast Surface States of Germanium ✓

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 7, pp. 1592-1596 ✓ B

TEXT: The authors studied the kinetics of the field effect $\tau_{f.e.}$ and of photoconductivity $\tau_{e.ph.}$ on over 15 high-resistivity n- and p-type germanium samples (20 - 25 ohm.cm); $\tau_{vol} \approx 200 \mu\text{sec}$ at room temperature. A

transverse field with Π -shaped pulses, light, and a constant field were used to change the primary curvature of the zone Y_B^0 . The samples, 70-300 μ thick, were etched with various agents and the following were then measured: 1) $\tau_{f.e.}(T)$, $\tau_{e.ph.}(T)$; 2) $\tau_{f.e.}$ as a function of the constant transverse field V as well as $\tau_{surf}(V)$; 3) $\Delta\sigma_1(V)$ and $\Delta\sigma_2(V)$; $\Delta\sigma_1$ denotes the primary, $\Delta\sigma_2$ the quasisteady variation of σ_{surf} ; 4) $\tau_{e.ph.}(V)$ and

Card 1/2

Investigation of the Kinetics of Fast Surface
States of Germanium

S/181/60/002/007/032/042
B006/B060

$\tau_{ph.quasist.}(V)$. The measurements were made at different temperatures both in the dark and at a low constant illumination. Fig. 1a shows $\tau_{f.e.}(T)|_{V=0}$ which illustrates the course typical of stripping processes; curve 1 is drawn in the dark, curve 2 under illumination; the activation energy was 0.27 and 0.18 eV, respectively. $\tau_{f.e.}(V)$ at 258, 228, 187, and 174°K is shown in Fig. 1b. The maxima of $\tau_{f.e.}$ attain some 100 microseconds. Fig. 2 shows the other functions investigated. The results are compared with those of other authors and are discussed. A table supplies, for two germanium samples, numerical values of $\tau_{f.e.}$ and $\tau_{e.ph.}$ in μsec for different surface states. There are 2 figures, 1 table, and 15 references: 5 Soviet, 9 US, and 1 British. ✓B

ASSOCIATION: Institut fiziki AN USSR Kiyev
(Institute of Physics of the AS UkrSSR, Kiyev)

SUBMITTED: November 30, 1959

Card 2/2